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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/744,043	03/14/2001	Stephen Charles Davis	602-1505	2334

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EXAMINER

GURZO, PAUL M

ART UNIT	PAPER NUMBER
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2881

DATE MAILED: 10/09/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Applicant(s)

Applicant(s)

09/744,043

DAVIS ET AL.

Examiner

Art Unit

Paul Gurzo

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 March 2001.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 February 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 112

Claims 3 and 15 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 3 recites the limitation "from the sample." There is insufficient antecedent basis for this limitation in the claim because this is the first time the "sample" has been introduced in the claims. Please substitute "the" with --a-- in the line 2. Appropriate correction is required.

Claim 15 is dependent on claim 13, but there is insufficient antecedent basis for "said paths." There is sufficient basis if claim 15 is dependent on the independent claim 14. Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 4, 7-10, and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reed et al. (5,619,034), and further in view of Park (6,107,625). Reed et al. teach the use of a

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source chamber for generating a particle beam. This particle beam is then accelerated (col. 4, lines 36-42). They also teach the use of multiple detectors and the value of each delay of the signals equals the phase time of the corresponding detector (col. 6, lines 33-42). They do not teach improving the accuracy of measurement of the m/z values of ions. However, Park teaches reflecting ions in a way that those with the same mass-to-charge ratio will have the same flight time. This reflecting makes the flight path longer and increases the mass resolving power of the spectrometer (col. 7, line 59 to col. 8, line 20). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to use multiple detectors to make improvement in the accuracy of the mass/charge values of the ions because accuracy is important in the determination of mass and charge ratio characteristics.

Regarding claim 4, Reed et al. show, in figure 3, a beam 22 that is accelerated in chamber 16. This beam is inclined, in the direction of the acceleration, at angle Θ with respect to the horizontal axis.

Regarding claim 7, Reed et al. teach the generation of a primary beam but do not teach how this beam is generated. However, Park describes a pulse of ions produced by laser ionization. These ions are then accelerated along the axis of the analyzer toward the reflectron (col. 12, lines 22-25).

Regarding claims 8 and 12, Reed et al. teach the generation of a primary beam but do not teach a means for delaying the operation of the acceleration means. However, Park describes that the ions produced by laser ionization are reflected back and forth between the reflectron and the accelerator and indefinite number of times (col. 12, lines 26-33). This reflecting serves to

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delay the operation of the acceleration means by temporarily trapping the particles released from the source prior to the acceleration.

Claims 2, 3, 6, and 9-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reed et al. (5,619,034) in view of Park (6,107,625), and further in view of Park et al. (5,753,909).

Regarding claim 2, in the above applied prior art, Reed et al. teach a focusing means (col. 4, lines 41-43) but fail to teach the use of two temporal focal points. However, Park et al. teaches these two temporal focal points with each detector situated at a respective temporal focal point (fig. 1, ref. 6 and 7). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to implement a focusing means providing two temporal focal points so that improvements can be made in the accuracy of the mass/charge values of the ions.

Regarding claim 3, the above applied prior art does not explicitly state a transportation means from the sample to the acceleration means. However, Reed et al. teaches that a primary beam is generated from a target surface at location A. These particles are then ejected from A and accelerated into chamber 16 (col. 4, lines 36-42). While not stated, the design makes use of a transportation means because these particles must be moved in some way from the sample to the accelerations means.

Regarding claim 6, Park et al. show, in figure 1, a reflection means 5 that is positioned in the path of the beam and the first detector 6. This figure clearly depicts the serpentine shape that is claimed.

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Regarding claims 9 and 10, Reed et al., in figure 2, illustrate the character of the signals from the respective locations. Each signal represents the arrival of the portions at the detector and is shown by a peak. The signals are substantially similar except that they are displaced by phase according to time of arrival (col. 4, lines 51-59). While Reed et al. does not explicitly state the use of a data acquisition means, Park et al. show this data processing means, that is connected to both detectors, in figure 1.

Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Reed et al. (5,619,034) in view of Park (6,107,625) in view of Park et al. (5,753,909), and further in view of the applicant's admitted prior art. On page 1 of the background, the applicant states that one example of a time of flight spectrometer is the MALDI-TOF spectrometer, which is commonly used to analyze molecular weight substances.

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Reed et al. (5,619,034) in view of Park (6,107,625), and further in view Cornish et al. (5,464,985). The above-applied prior art teaches all of the limitations of the claim except the act of reflecting particles so that those with a higher kinetic energy travel a longer path. However, Cornish et al. teach that ions with higher kinetic energy penetrate the reflectron more deeply than those with lower kinetic energy, and thus travel a longer path to their focal point (col. 3, lines 62-65). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to reflect the particles with higher kinetic energy to a longer path so they do not overtake the particles with lower kinetic energy so that the variations in initial kinetic energy will not reduce the mass accuracy of the spectrometer.

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Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Reed et al. (5,619,034) in view of Park (6,107,625) in view Cornish et al. (5,464,985), and further in view of Dowell (5,331,158). Cornish et al. teach that ions are formed and accelerated and fragmentation is induced by collisions with a target gas (col. 5, lines 11-14). This collision with the target gas can serve to trap the particles. But, they do not teach the injection of this gas. However, Dowell teaches of two ion beams that pass through a gaseous dispersion of injected sample gas (col. 7, lines 55-60). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to inject this gas into the appropriate zone so that it interacts with the particles so that a means of trapping can occur to prevent particles with higher kinetic energy from overtaking those with lower kinetic energy.

Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Reed et al. (5,619,034) in view of Park (6,107,625), and further in view of Dowell (5,331,158). The above-applied prior art teaches releasing the ionized particles from the sample and measuring the time of arrival of the particles at two points of differing distances from the sample to determine m/z characteristics. This art fails to teach the use of accelerating particles along two paths. However, Dowell shows, in figure 1, two ion beams 30A and 30B that travel along two separate paths and impinge on detectors 38A and 38B (fig. 1 and col. 4, lines 3-12). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the two path design so that differences in the measured time of arrivals could be calculated, leading to an improvement in the accuracy of the mass/charge values of the ions because accuracy is important in the determination of those characteristics.

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Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Reed et al. (5,619,034) in view of Park (6,107,625) in view of Dowell (5,331,158), and further in view of Park et al. (5,753,909). The prior art teaches all of the limitations except the generally serpentine shape of the beam. However, Park et al. teach this shape as described above. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to use this beam shape so that the beam is able to travel the needed distance and arrive at the proper focal points so that determination of mass and charge ratio characteristics is possible.

Allowable Subject Matter

Claim 15 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Whitehouse et al. U.S. Patent No. 6,040,575 disclose the use of a MALDI-TOF laser.

Baril U.S. Patent No. 6,037,586 discloses the use of detectors as well as acceleration means after a sample is bombarded by a primary beam.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Paul Gurzo whose telephone number is (703) 306-0532. The examiner can normally be reached on M-F 8:30 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Lee can be reached on (703) 308-4116. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

PMG

PMG
September 6, 2002


JOHN R. LEE
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